National Climatic Data Center

DATA DOCUMENTATION

FOR

DATASET 9789 (DSI-9789)

Turbidity Data File

September 16, 2003

National Climatic Data Center
151 Patton Ave.
Asheville, NC 28801-5001 USA

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1. Abstract: Turbidity Data File is historical digital data set DS-9789, archived at the National Climatic Data Center (NCDC). Atmospheric turbidity is a measurement of solar extinction by aerosols (suspension of insoluble particles in a gas) in the atmosphere. It gives an indication of the amount of particles in a certain size range in the column of air between the observer and the top of the atmosphere. This data set contains discrete observations of turbidity data taken at various times during the day at selected global stations during the years 1965-1994. Major parameters in the data set are sunphotometer wavelength (nanometers), calibration factors corresponding to the wavelengths of the sunphotometer, Tau values, diopter (air mass measurement), and meter value in nanometers. Other parameters are aerosol optical depths, corrected factor of mean sun-earth distance, visibility, obstructions to vision, dry bulb and dew point temperatures (Deg. C), wind direction (56 points) and speed (knots), sky cover (coded), temperature of recording device (Deg. C), station pressure (mb), calculated aerosol-optical depth (natural LO), true air mass values (calculated from the date, time, and location of the observation), and wavelength exponents.

2. Element Names and Definitions:

Element Format

1. Station number – a unique 5-digit number assigned by NCDC to identify the station

2. WMO number – a 5-digit WMO number identifying those stations that are WMO stations

3. Station name – a 31-character field giving the station name and country

4. Measurement units – a code that identifies temperature and wind speed units:
   M – Centigrade, meters/sec.
   E – Fahrenheit, knots
   B – Centigrade, knots

5. Latitude – degrees and minutes followed by N or S

6. Longitude – degrees and minutes followed by E or W

7. Elevation – meters

8. Time zone – as politically determined and expressed in tenths (Example: India is time zone 5.5)

9. Meter number – a 5-digit ID of the sunphotometer in use

10. Wavelength – 1-4 wavelengths measured by the sunphotometer

11. Calibration factors – 1-4 calibration factors corresponding to the wavelengths of the instrument expressed in hundredths. The calibration factor is the energy the sunphotometer would measure if there were no atmosphere.

12. Tau – is the sum of the Rayleigh Scattering and Ozone Absorption Coefficients for the wavelength of the station. The values are derived from

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Elterman's Tables and are expressed in natural logs.

13. Year – expressed in 3 digits; 1978 is stored as 978

14. Month – the 2-digit month number

15. Day – the 2-digit calendar date of the month

16. Hour – the 2-digit military hour

17. Minute – the 2-digit military minute of the observation

18. Diopter – the air mass for the time of observation as read from the instrument, in hundredths

19. Meter value – the meter value from the instrument for the wavelength being measured, in tenths

20. Observed Aerosol Optical Depth – the turbidity value determined at the station by graph (nomogram), expressed in thousandths, of the natural log

21. Sun-Earth Distance – the correction factor for the mean sun-earth distance, in thousandths

22. Visibility – a 2-digit code specified by WMO code 4377

23. Haze, Smoke, Fog – a 1 indicates the presence of these obstructions to vision. A blank field indicated an obstruction is not present.

24. Dry-bulb temperature – whole degrees centigrade or Fahrenheit determined by the code in field 4

25. Dew Point temperature – same as dry-bulb temperature

26. Wind Direction – 2 digits expressed as tens of degrees.

27. Wind direction – whole knots or meters/sec. determined by the code in field 4

28. Sky cover – tenths of total sky

29. Instrument temperature – whole degrees centigrade

30. Station pressure – tenths of millibars

31. Calculated Aerosol Optical Depth – the turbidity value calculated from the time of observation and the meter value, expressed in ten thousandth, of natural logs for each wavelength measured.

32. Air mass – the true air mass value calculated from the date, time, and location of the observation, in hundredths.

Archive Format

Element	**Position**
Station number	1-5

:
:

WMO number	6-10
Station name	11-41
Measurement units indicator	42
Latitude (degrees, minutes)	43-46
N or S	47
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Flag – Alpha out of range	235
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Flag – Observed vs. Calculated Mean Solar Distance	238
Flag – Dew point greater than Dry bulb	239
Blank Field	240

3. **Start Date**: 19650101

4. **Stop Date**: 19941231

5. **Coverage**:

   a. Southernmost Latitude: -90.0S
   b. Northernmost Latitude: 90.0N
   c. Westernmost Longitude: -180.0W
   d. Easternmost Longitude: 180.0E

6. **How to Order Data**:

   Ask NCDC's Climate Services about the cost of obtaining this data set.
   Phone: 828-271-4800
   FAX: 828-271-4876
   E-mail: **NCDC.Orders@noaa.gov**

7. **Archiving Data Center**:

   Archive Branch
   National Climatic Data Center
   151 Patton Avenue
   Asheville, NC 28801

8. **Technical Contact**:

   National Climatic Data Center
   151 Patton Avenue
   Asheville, NC 28801

9. **Known Uncorrected Problems**: None.

10. **Quality Statement**: These measurements when carried out with well-calibrated instruments are considered to be of scientific importance.

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Unfortunately, due to lack of regular calibrations, aging of the filters, etc., the existing database is of extremely poor quality and needs careful scrutiny before attempting any scientific use.

11. Essential Companion Datasets: None.

12. References: None.